Greenhouse Gas Emissions in Somerville

Monitoring Progress Toward Carbon Neutrality by 2050

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Greenhouse Gas Emissions Inventory: Process

• Goal: carbon neutral Somerville by 2050

• Two inventories: LGO and Community-wide
  – Baseline = 2014; **Monitoring Year 1 = 2016**

• Workbook familiarization
  – Prepared by AECOM (consultant) in 2014
  – Set up to facilitate monitoring through 2050
Greenhouse Gas Emissions Inventory: Process

<table>
<thead>
<tr>
<th>GPC ref. No.</th>
<th>Scope</th>
<th>Emission Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.1.1</td>
<td>1</td>
<td>Natural Gas</td>
</tr>
<tr>
<td>11.1.2</td>
<td>2</td>
<td>Electric</td>
</tr>
<tr>
<td>11.1.3</td>
<td>3</td>
<td>Electric</td>
</tr>
<tr>
<td>11.2.1</td>
<td>1</td>
<td>Natural Gas</td>
</tr>
<tr>
<td>11.2.2</td>
<td>2</td>
<td>Electric</td>
</tr>
<tr>
<td>11.2.3</td>
<td>3</td>
<td>Electric</td>
</tr>
</tbody>
</table>

**Emission Factors**

Use this table to record the emission factors used to calculate GHG emissions from all the activities included in the inventory. References provided in column C are used to identify the relevant emission factors in the factor tables.

### Stationary Energy Factors

<table>
<thead>
<tr>
<th>Fuel type or activity</th>
<th>Reference</th>
<th>Type</th>
<th>GWP</th>
<th>Units</th>
<th>100</th>
<th>500</th>
<th>1000</th>
<th>5000</th>
<th>10000</th>
<th>50000</th>
<th>100000</th>
<th>500000</th>
<th>Total CO2e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Gas (Furnace)</td>
<td>GHG SAI</td>
<td>t / therm</td>
<td>0.0000000</td>
<td>0.0000000</td>
<td>0.0000000</td>
<td>0.0000000</td>
<td>0.0000000</td>
<td>0.0000000</td>
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<td>0.0000000</td>
<td>0.0000000</td>
<td>0.0000000</td>
<td>0.0000000</td>
</tr>
</tbody>
</table>

### Transportation Factors

<table>
<thead>
<tr>
<th>Fuel type or activity</th>
<th>Reference</th>
<th>Type</th>
<th>GWP</th>
<th>Units</th>
<th>100</th>
<th>500</th>
<th>1000</th>
<th>5000</th>
<th>10000</th>
<th>50000</th>
<th>100000</th>
<th>500000</th>
<th>Total CO2e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger Veh. (Year)</td>
<td>CO2e SAI</td>
<td>t / veh</td>
<td>0.0005192</td>
<td>0.0005192</td>
<td>0.0005192</td>
<td>0.0005192</td>
<td>0.0005192</td>
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</tr>
</tbody>
</table>

### Waste Factors

<table>
<thead>
<tr>
<th>Fuel type or activity</th>
<th>Reference</th>
<th>Type</th>
<th>GWP</th>
<th>Units</th>
<th>100</th>
<th>500</th>
<th>1000</th>
<th>5000</th>
<th>10000</th>
<th>50000</th>
<th>100000</th>
<th>500000</th>
<th>Total CO2e</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste Incineration (Year)</td>
<td>CO2e SAI</td>
<td>t</td>
<td>0.0109752</td>
<td>0.0109752</td>
<td>0.0109752</td>
<td>0.0109752</td>
<td>0.0109752</td>
<td>0.0109752</td>
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Greenhouse Gas Emissions Inventory: Process

• Workbook familiarization
  – Prepared by AECOM (consultant) in 2014
  – Set up to facilitate monitoring through 2050
• Data needs and sources identification
• Data collection and processing
• Analysis and visualization of results
Data Collection
Local Government Operations

**Sectors and Types**
- Buildings and Facilities
  - Electricity
  - Natural Gas
- Public Lighting
  - Electricity
- Vehicle Fleet
  - Fuel Consumption
- Process and Fugitive Emissions
  - Refrigerants (skating rink)

**Sources**
- Mass Energy Insight database
- EverSource
  - Electricity and natural gas
- National Grid
  - Natural gas
- **FuelMaster database**
- Refrigerant supplier records
- All empirical data
Data Collection
Community Inventory

Sectors and Types

• Stationary Energy
  – Electricity
  – Natural gas
  – Heating oil*

• Transportation
  – On-road (passenger and truck)*
  – Off-road vehicles and equipment*
  – Public transit (buses and trains)*

• Waste
  – Trash tonnage (partial model)*
  – Wastewater treatment*

Sources

• EverSource
  – Electricity and natural gas
• National Grid
  – Natural gas
• Census data
  – Heating oil model
• MPO regional on-road model
• EPA MOVES2014a off-road model
• MBTA GIS data, schedule info
• DPW residential waste collection data
  – State per capita average for commercial waste
• DPW wastewater volume data
  – Biological oxygen demand model
  – Electricity estimate
• MWRA water volume data
  – Electricity estimate

*Modeled inputs
Preliminary Results
Local Government Operations

### 2014
- Municipal Buildings: 74%
- Traffic Control Boxes: 1%
- Public Lighting: 11%
- On-Road Vehicles: 11%
- Off-Road Vehicles and Equipment: 3%
- Refrigerants: <1%

### 2016
- Municipal Buildings: 73%
- Traffic Control Boxes: 1%
- Public Lighting: 9%
- On-Road Vehicles: 16%
- Off-Road Vehicles and Equipment: <1%
- Refrigerants: <1%
Preliminary Results
Local Government Operations

Progress: Base Year (2014) vs. Monitoring Year (2016)

- Municipal Buildings
- Public Lighting
- Off-Road Vehicles and Equipment
- Other Municipal Facilities
- On-Road Vehicles
- Refrigerants

TOTAL CHANGE: - 1239 MT
- 10.4%
Preliminary Results

Community Inventory

2014

Stationary Energy 64%

Transportation 34%

Waste 2%

2016

Stationary Energy 62%

Transportation 36%

Waste 2%
Preliminary Results
Community Inventory

Emissions (MT CO₂/yr)

- **2014:** 609,561 MT
- **2016:** 574,443 MT

**TOTAL CHANGE:**
- 35,118 MT
- 5.8%
Preliminary Results

Community Inventory

Stationary Energy

<table>
<thead>
<tr>
<th>Category</th>
<th>2014</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Buildings</td>
<td>200,000</td>
<td>180,000</td>
</tr>
<tr>
<td>Commercial and Institutional Buildings</td>
<td>160,000</td>
<td>140,000</td>
</tr>
<tr>
<td>Fugitive Emissions from Natural Gas</td>
<td>40,000</td>
<td>30,000</td>
</tr>
<tr>
<td>Other Non-Specified Energy Use</td>
<td>20,000</td>
<td>10,000</td>
</tr>
</tbody>
</table>
Final Deliverables Preview